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On the cover: a gem, ca. AD 200; see the paper of Kostova / Sharankov in this issue; photo Nicolay Sharankov.

The Armour of the Thracian Warriors – an Archaeometrical Approach

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Boika ZLATEVA / Totko STOYANOV / Deyan LESIGYARSKI /
Velislav BONEV

Abstract: The elemental composition of the original metal alloys of the armour of Thracian warriors was determined using a portable X-ray fluorescence spectrometer. The archaeological breastplates date from the late 6th to 5th c. BC and are of two types: bronze and bimetallic (iron and bronze).

Original metal alloys used by ancient craftsmen to produce specific items were characterized based on the concentrations of 24 chemical elements. The results indicate that for the production of cuirasses, tin bronzes well purified from lead and bismuth has been used. However, the decoration elements and some spare parts (used for armour repair) have also been made of specific alloys.

Key words: panoply, bronze cuirass, pXRF, Thrace, Archaic period, Classical period.

INTRODUCTION

The panoply of Thracian warriors carries valuable information about Thracian warfare, the burial rites of their aristocracy, and their technological and metalworking achievements. Not to mention that the artifacts reflect Thracian beliefs, mythological concepts, aesthetic perceptions, and personal preferences. The present study is focused on the cuirasses found in the territory that was once part of ancient Thrace. The artifacts are dated to the late Archaic and Classical periods (end of the 6th-5th centuries BC). In fact, there are no articles representing chemical analyses of bronze cuirasses from this period found in the Balkans. There is also a lack of such investigations concerning artifacts of this type from other parts of Europe. Analysis of bronze cuirasses from pre-Roman Italy can be found in the paper of Emmitt et al. (2021).

The work presented here is part of a larger research project on the defensive armour of the Thracians (helmets, cuirasses, greaves, and shields)¹. This complex archaeometrical investigation includes both chemical analyses to determine the types of alloys used and archaeological data sets for the artifacts. The combination of the obtained data reveals additional information about the Thracians and their habits.

In the last 10-15 years, special attention has been paid to portable XRF spectrometers, usually used for *in situ* analyses at archaeological sites or museum expositions (Frahm / Doonan 2013; Killick 2015; Liritzis et al. 2020). Furthermore, the increasing availability of portable XRF devices, as well as their moderate cost when compared to laboratory-based techniques, more frequently allows the incorporation of chemical examinations in material culture studies.

MATERIALS AND METHODS

This study presents the results of the chemical analysis of eight cuirasses from rich burials of Thracian warriors, kept in different historical museums in the territory of modern Bulgaria (**fig. 1**). The inves-

¹ “The Panoply of the Thracian warriors: a complex interdisciplinary study of a bronze defensive armor from Thrace” funded by the Bulgarian Scientific Research Fund, Contract KII-06-OIP 05/7, December 17, 2018. As a part of the project, in 2022 a temporary exhibition “The Panoply of the Thracian warriors” was presented in one of the halls of the National Archaeological Institute with Museum, which exhibited a large part of the objects of research in the project – helmets, cuirasses, greaves, and shields, as well as part of the inventory of some representative tomb complexes in which they were found. In the publication presenting the exhibition, Stoyanov et al. (eds.) (in press), the items of defensive armour are presented with detailed catalog annotations and photo documentation. The armour commented on here are # 58-65. Commentary texts are also presented for each artefacts groups.



Fig. 2. Bronze cuirass from Tatarevo (Krasimir Georgiev)



Fig. 3. Bronze cuirass from Svetlen (Miglena Raykovska)



Fig. 4. Bronze cuirass from Tarnicheni (Miglena Raykovska)



Fig. 5. Bronze cuirass from Ruets (Miglena Raykovska)



Fig. 6. Bronze cuirass from Bashova mound (Miglena Raykovska)



Fig. 7. Bronze cuirass from Svetitsa mound (Krasimir Georgiev)

iron gorget (hausse-col) similar to that from Mezek tomb (Ogdenova 1961, 530-531, figs. 15-18). L. Ogdenova admitted armour of Type 2 is not able to be classified amongst the bell-shaped cuirasses, because it performs a more developed design, allowing a greater mobility to the head and neck that is more suitable for use while riding. These are a local invention with no parallels in Greece. The specimen from Dalboki was dated in the end of 5th c. BC and those from Ruets and Bashova mound in the beginning of the 4th c. BC (Ogdenova 1961, 516-522, 527-535, figs.10-14, 15-19).

Classical Period Bronze Cauldrons from Thrace

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Yana MUTAFCHIEVA

Abstract: This article focuses on presenting a specific type of bronze cauldrons found in Thrace and dated to the Classical period. They are low-necked with a hemispherical body, rounded bottom, riveted handle attachments and ring-shaped handles. They can be associated with the classes of material dedicated to feasting equipment and as toiletry objects, and were probably used in certain rituals. Despite their formal stylistic similarities, the geographical and chronological distribution of the presented examples allows some of them to be ascribed to a particular production workshop.

Key words: Bronze cauldrons, Thrace, Classical period.

INTRODUCTION

The bronze cauldrons dealt with in this article have a simple and chronologically consistent shape. They are part of the household inventory of vessels used for cooking over an open fire. They can also be connected with use as toiletry vessels, and also possibly participating in certain rituals and practices. The cauldrons discussed here have identical characteristics and morphological features, and form the group of cauldrons with a low neck, hemispherical body, rounded bottom, riveted handle attachments and ring handles. A large number of them were found together with iron tripods, which served as stands for the vessels. The cauldrons from Thrace come from burial complexes, and one of them contained a deposited hoard of silver objects. The examined cauldrons can generally be attributed to the Classical period. In different chronological periods, similar vessels were decorated with various attachments - mostly having apotropaic functions.

The current study aims mainly at presenting and analysing the examples of these bronze cauldrons which were discovered in the territory of Thrace. Within the general goal thus set, the main tasks are: to form an outline of the inventory and the complexes from which the bronze vessels originate; to trace the geographical distribution of products identical in shape and decoration; placing the cauldrons in the narrowest possible chronological frame; and two attempt the localisation of the production workshops.

BRONZE CAULDRONS FROM THE TERRITORY OF THE TRACE

The cauldron from Kukova tumulus, near the village of Duvanlii, Plovdiv region

The cauldron was discovered in the 1920s in Kukova tumulus (figs. 1a-d, 2a-b). It is made from a hammered bronze sheet and its dimensions are: $h_{\max} = 26.5$ cm and $dr_{\max} = 35.5$ cm. Two oppositely placed rectangular handle attachments with decoratively cut-off undersides are attached onto the shoulders of the cauldron and secured with three bronze rivets each (figs. 2a-b). The handle attachments resemble highly stylised birds with spread wings and tail. Two bronze ring-shaped handles (one missing) pass through staples mounted on each of the two attachments; the diameter of the preserved ring is 7.0 cm.



Fig. 4a. Bronze cauldron from Letnitsa (T. Dimitrov)



Fig. 4b. Bronze cauldron from Letnitsa (Y. Mutafchieva)



Fig. 4c. Handle attachment of the cauldron from Letnitsa (Y. Mutafchieva)



Fig. 4d. Handle attachment of the cauldron from Letnitsa (Y. Mutafchieva)

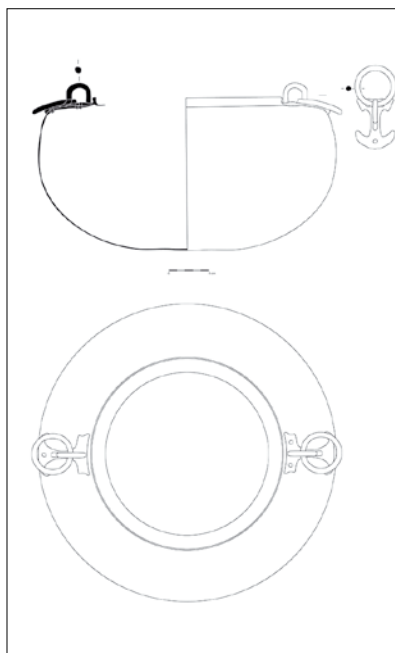


Fig. 4e. Graphical reconstruction of the bronze cauldron from Letnitsa (Y. Mutafchieva)



Fig. 4f. Antique repair patch with four rivets into the bronze cauldron from Letnitsa (Y. Mutafchieva)

283-292; Венедиков / Павлов 1974; Стоянов 1990, 83-87, обр. 1-2; Венедиков 1996, 7-24, обр. 1-21; Бошнакова 2000a, 5-22, обр.1-17; Бошнакова 2000b, 19-29, 1a, 2-7). According to the researchers of the Letnitsa Treasure, the attachments fall within the chronological framework of the second quarter of the 4th c. BC (Венедиков 1996, 18) or the third quarter of the 4th c. BC (Бошнакова 2000b, 20).

The Cauldron from Peretu, Romania

The cauldron from Peretu, Romania is in a fragmentary state (Moscalu 1989, 149, Abb. 13; Taf. 48/1; Goldhelm 1994, 160, cat. 48.17; Teleaga 2008, 252, cat. 955; Oanță-Marghitu 2013, 265). The mouth of the preserved upper part of the vessel has (fig. 5). Its dimension are: $dr_{\text{mouth}} = 21.0$ cm and an everted rim. The handle attachments measuring are with $h = 3.3$ cm, $l = 7.1$ cm и $w = 6.0$ cm. They have upper parts shaped like heads of birds, holding the ring-shaped handles ($dr = 6.6$ cm). The bird-shaped handle attachments are pinned of the shoulders with three rivets